

**WHAT IS CLAIMED IS:**

1. A method for determining a mechanical axis of a femur using a computer aided surgery system having an output device for displaying said mechanical axis, the method comprising:

providing a position sensing system having a tracking device capable of registering instantaneous position readings and attaching said tracking device to said femur;

locating a center of a femoral head of said femur by moving a proximal end of said femur to a first static position, acquiring a fixed reading of said first static position, repeating said moving and said acquiring for a plurality of static positions; and locating said centre by determining a central point of a pattern formed by said plurality of static positions;

digitizing an entrance point of said mechanical axis at a substantially central position of said proximal end of said femur; and

joining a line between said entrance point and said center of rotation to form said mechanical axis.

2. A method as claimed in claim 1, wherein said position sensing system automatically registers said instantaneous position readings periodically and said acquiring a fixed reading comprises taking an average value of a plurality of said instantaneous position readings to determine said static position.

3. A method as claimed in claim 1, wherein said position sensing system responds to user input to register said instantaneous

position readings and said acquiring a fixed reading comprises enabling said position sensing system to register a single instantaneous position reading.

4. A method as claimed in claim 1, wherein said pattern formed by said plurality of static positions is a conical pattern.

5. A method as claimed in claim 1, wherein said plurality of static positions is between 7 and 10.

6. A method as claimed in claim 1, wherein said plurality of static positions is 14.

7. A method as claimed in claim 1, wherein said acquiring a fixed reading comprises determining a position of said proximal end relative to a reference.

8. A method as claimed in claim 7, wherein said reference is a fixed reference placed on a pelvis bone adjacent to said femur.

9. A method as claimed in claim 1, wherein said repeating said moving comprises waiting for a signal from an acquisition system that said fixed reading has been acquired before moving to a next static position.

10. A method as claimed in claim 9, wherein said signal is an audio sound.

11. A method as claimed in claim 1, wherein said repeating said moving comprises moving said proximal end at least 20 mm to a next static position.

12. A method as claimed in claim 1, wherein said digitizing comprises applying an instrument to a surface of said bone such that a point and a normal axis to said point are determined.

13. A method as claimed in claim 1, wherein said substantially central position is determined visually.

14. A method as claimed in claim 1, wherein said bone is a femur, said first end is a femoral head of said femur, and said substantially central position is determined by locating an inter-condylar notch.

15. A method as claimed in claim 14, wherein said inter-condylar notch is located by digitizing a medial and a lateral epicondyle at said second end of said femur, forming an epicondylar axis, and determining a center of said epicondylar axis.